



## CRITERION 736

## MANUAL DRY STANDPIPE SYSTEMS

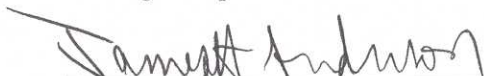
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**RECORD OF REVISIONS**

<b>Revision No.</b>	<b>Date</b>	<b>Description</b>
0	04/30/98	Initial Issue
1	09/12/02	<p>This revision reflects the conversion from a WordPerfect document into a Microsoft Word document and additional clarification on how to develop criteria. This revision includes:</p> <ul style="list-style-type: none"><li>• The addition of a Table of Contents,</li><li>• The use of basis statements in Sections 6, 7, and 9,</li><li>• Revision to Section 9, "Required Documents," and</li><li>• Further clarification in the use of references.</li></ul>

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## **CRITERION 736**

### **MANUAL DRY STANDPIPE SYSTEM**

#### **1.0 PURPOSE**

The purpose of this Criterion is to establish the minimum requirements and best practices for operation and maintenance of manual dry standpipe systems at LANL (as defined by NFPA 14).

This document addresses the requirements of LIR 230-05-01(Ref 10.1), "Operations and Maintenance Manual" and the requirements of LIR 402-910-01.4, "LANL Fire Protection Program."

Implementation of these requirements and recommendations satisfies DOE Order 430.1A (Ref. 10.2), "Life Cycle Asset Management," Attachment 2 "Contractor Requirements Document," Paragraph 2, sections A through C, which in part require UC to "...maintain physical assets in a condition suitable for their intended purpose" and employ "preventive, predictive, and corrective maintenance to ensure physical asset availability for planned use and/or proper disposition." Compliance with DOE Order 430.1A is required by Appendix G of the UC Contract.

#### **2.0 SCOPE**

The scope of this Criterion includes the routine inspection, testing and preventive and predictive maintenance of manual dry standpipe systems. This Criterion does not address corrective maintenance actions required to repair or replace equipment.

#### **3.0 ACRONYMS AND DEFINITIONS**

##### **3.1 Acronyms**

<b>AHJ</b>	Authority Having Jurisdiction
<b>CFR</b>	Code of Federal Regulations
<b>DOE</b>	Department of Energy
<b>FDC</b>	Fire Department Connection
<b>ITM</b>	Inspection, Testing, and Maintenance
<b>LIR</b>	Laboratory Implementing Requirement
<b>LPR</b>	Laboratory Performance Requirement

<b>O&amp;M</b>	Operations and Maintenance
<b>PP&amp;PE</b>	Personal Property and Programmatic Equipment
<b>RP&amp;IE</b>	Real Property and Installed Equipment
<b>SSC</b>	Structures, Systems, and Components
<b>SSS</b>	Support Services Subcontractor
<b>UC</b>	University of California

### 3.2 Definitions

**Control Valve**-A valve that controls flow to water-based fire protection systems. For this Criterion, control valves include standpipe control valves and hose valves.

**Management Level Determination (ML1, ML2, ML3, ML4)**-A classification system for determining the degree of management control applied to facility work. See LIR 230-01-02 for definitions of each ML level.

## 4.0 RESPONSIBILITIES

### 4.1 FWO-Systems, Engineering and Maintenance (FWO-SEM)

- 4.1.1** FWO-SEM is responsible for the administrative content of this Criterion and monitoring the applicability and the implementation status of this Criterion and either assisting the organizations that are not applying or meeting the implementation expectations contained herein or elevating their concerns to the director(s).

*Basis:* LIR 301-00-01.11; Issuing and Managing Laboratory Operations Implementation Requirements and Guidance, Section 5.4, OIC Implementation Requirements.

- 4.1.2** FWO-SEM shall provide technical assistance to support implementation of this Criterion.

### 4.2 FWO-Fire Protection (FWO-FIRE)

- 4.2.1** FWO-FIRE is responsible for the technical content of this Criterion and monitoring the proper implementation across the Laboratory.
- 4.2.2** FWO-FIRE shall provide technical assistance to support implementation of this Criterion.

### 4.3 Facility Manager

- 4.3.1** Responsible for operation and maintenance of institutional, or Real Property and Installed Equipment (RP&IE) under their jurisdiction, in accordance with the requirements of this document.

- 4.3.2** Responsible for operations and maintenance of those Personal Property and Programmatic Equipment (PP&PE) systems and equipment addressed by this document that may be assigned to the FM in accordance with the FMU-specific Facility Tenant Agreement.

#### **4.4 Group Leader**

- 4.4.1** Responsible for operations and maintenance of those Personal Property and Programmatic Equipment (PP&PE) systems and equipment addressed by this document, which are under their jurisdiction.
- 4.4.2** Responsible for system performance analysis and subsequent replacement or refurbishment of assigned PP&PE based on sound Life Cycle Analysis techniques and system-specific performance requirements.

#### **4.5 Authority Having Jurisdiction (AHJ) – LANL Fire Marshal**

- 4.5.1** The AHJ is responsible for providing a decision on specific technical questions regarding this criterion.
- 4.5.2** The LANL Fire Marshal is the approval authority for all exceptions and variances to this Criterion.

#### **4.6 Support Services Subcontractor**

- 4.6.1** Responsible for providing ITM of the fire protection systems addressed in this Criterion at the request of the responsible Facility Manager.
- 4.6.2** Responsible for coordinating work with operating group and Facility Manager to conduct ITM in the affected area.

### **5.0 PRECAUTIONS AND LIMITATIONS**

#### **5.1 Precautions**

This section is not intended to identify all applicable precautions necessary for implementation of this Criterion. A compilation of all applicable precautions shall be contained in the implementing procedure(s) or work control authorization documents. The following precautions are intended only to assist the author of a procedure or work control document in the identification of hazards/precautions that may not be immediately obvious.

## **5.2 Limitations**

The intent of this Criterion is to identify the minimum generic requirements and recommendations for SSC operation and maintenance across the Laboratory. Each user is responsible for the identification and implementation of additional facility specific requirements and recommendations based on their authorization basis and unique equipment and conditions, (e.g., equipment history, manufacturer warranties, operating environment, vendor O&M requirements and guidance, etc.).

Nuclear facilities and moderate to high hazard non-nuclear facilities will typically have additional facility-specific requirements beyond those presented in this Criterion. Nuclear facilities shall implement the requirements of DOE Order 4330.4B (Ref. 10.3) as the minimum programmatic requirements for a maintenance program. Additional requirements and recommendations for SSC operation and maintenance may be necessary to fully comply with the current DOE Order or CFR identified above.

## **6.0 REQUIREMENTS**

Minimum requirements that Criterion users shall follow are specified in this section. Requested variances to these requirements shall be prepared and submitted to FWO-SEM in accordance with LIR 301-00-02 (Ref. 10.4), "Variances and Exceptions to Laboratory Operations Requirements," for review and approval. The Criterion users are responsible for analysis of operational performance and SSC replacement or refurbishment based on this analysis. Laws, codes, contractual requirements, engineering judgement, safety matters, and operations and maintenance experience drive the requirements contained in this section.

### **6.1 Operations Requirements**

#### **6.1.1 Operational Checklist**

The manual dry standpipe system must be operational at all times. The manual dry standpipe system shall be deemed operational when the following conditions exist:

- The Fire Department Connection (FDC) is available for connection to the water source and is in good repair with pumper hose valves closed and operational.
- The system hose valves are in their required locations, are operational and in good repair and are arranged so that hoses can be connected.
- An adequate supply of water and pressure is available from the fire department pumper(s) to supply the system at its required volume and pressure.

- All piping, fittings, hangers, and other components are in their proper locations and are in good repair.

*Basis:* NFPA 14, 2000 Edition Standard for the Installation of Standpipe, Private Hydrant and Hose Systems, Section 1-4 and 3-2.4. Compliance with this NFPA code is required per Appendix G of the UC contract.

### **6.1.2 Semi-Annual Inspections**

Inspect all components of the system including piping, hose connections, pipe supports, and allied equipment, to ensure the system is free of corrosion, foreign material, physical damage, tampering, or other conditions that would prevent operation.

*Basis:* NFPA 25, 2002 Edition Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, Section . Semi-Annual recommendation per DOE approved equivalency to NFPA 25. Compliance with this NFPA code is required per Appendix G of the UC contract.

#### **6.1.2.1 Hose Valves**

Visually inspect all hose valves to ensure the following:

- outlet hose threads are undamaged,
- caps are installed, and
- required adapters are in place.

NOTE: Clean, repair, or replace internal components as necessary in accordance with the manufacturer's instructions.

*Basis:* NFPA 25, 2002 Edition Standard for Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, Section . Semi-Annual recommendation per DOE approved equivalency to NFPA 25. Compliance with this NFPA code is required per Appendix G of the UC contract.

### **6.1.3 Quarterly Inspections**

#### **6.1.3.1 FDCs**

Fire Department Connections (FDCs) shall be inspected to verify the following:

- FDCs are visible and accessible.
- Couplings or swivels are undamaged and rotate smoothly.
- Plugs or caps are in place and undamaged,



- If FDC plugs or caps are not in place, the interior of the FDC shall be inspected for obstructions and the valve clapper shall be verified to be operational over its full range.
- Gaskets are in place and in good condition.
- Identification signs are in place.
- Check valve is not leaking.
- The automatic drain valve (ball drip) is in place and operating properly.
- Components are cleaned, repaired, or replaced as necessary in accordance with the manufacturer's instructions.

*Basis:* NFPA 25, 2002 Edition Standard for the Inspection, Testing and Maintenance of Water-based Fire Protection Systems, 1998, Chapter 9-7.1. Compliance with this NFPA code is required per Appendix G of the UC contract.

#### **6.1.3.2 Pressure Regulating Valves (if applicable)**

Visually inspect all pressure regulating valves to ensure valves are:

- In the open position, and
- In good condition, with handwheels installed.

*Basis:* NFPA 25, Water-Based Fire Protection Systems, 1998, Chapter 9-5.1.1, Chapter 3-3.1.1 and DOE Approved NFPA 25 Equivalency. Compliance with this NFPA code is required per Appendix G of the UC contract.

#### **6.1.4 Other Frequencies**

##### **6.1.4.1 Check Valves**

Check valves shall be inspected internally every five years to verify that all components operate properly, move freely and are in good condition.

### **6.2 Testing Requirements**

#### **6.2.4 Testing**

- Where provided, waterflow alarm and supervisory devices shall be tested on a quarterly basis.
- Conduct an initial flow test by flowing the required volume of water at the hydraulically most remote, highest, or dead-end hose connection of each zone of the

standpipe system. When a flow test of the hydraulically most remote outlet is not practical, consult FWO-FIRE for a more appropriate location of the test. Conduct a flow test every 5 years thereafter. Use current design requirements for all testing. FWO-FIRE must approve the actual test method(s) and performance criteria in advance.

- Every 5 years, and following system modification or repair that breaches the piping pressure boundary, conduct a hydrostatic test of the affected piping at not less than 200 psi for 2 hours, or at 50 psi in excess of the maximum pressure when the maximum pressure is in excess of 150 psi. Measure the hydrostatic test pressure at the low elevation point of the individual system or zone being tested. The inside standpipe piping shall show no leakage. Drain the standpipe after each test.

**EXCEPTION:** Where cold weather prevents test with water, an interim air test shall be permitted to be conducted prior to the standard hydrostatic test. An air pressure leakage test at 40 psi shall be conducted for 24 hrs. Any leakage that results in a loss of pressure in excess of 1 ½ psi during a continuous 24-hour period shall be corrected.

**NOTE:** Conduct a flow test on each valve initially, and at 5-year intervals thereafter, in accordance with the manufacturer's instructions. Clean, repair, or replace internal components as necessary in accordance with the manufacturer's instructions.

*Basis:* NFPA 25, Water-Based Fire Protection Systems, 1998, Chapter 9-5.1, Chapter 3-2.2 and NFPA 14 Standpipe, Private Hydrant, and Hose Systems, 2000, Chapter 9-5.1 and 9-4.1. Compliance with this NFPA code is required per Appendix G of the UC contract.

### **6.3 Maintenance**

- Refer to Appendix A-Quarterly Inspection and Maintenance of Dry Standpipe Systems of this document for the inspection and testing of all standpipe systems.
- Provide additional maintenance as recommended by the manufacturer's instructions for all components of standpipe systems.
- Clean, repair, or replace internal components in all system valves as necessary in accordance with the manufacturer's recommendations.

*Basis:* NFPA 25, Water-Based Fire Protection Systems, 1998, Chapter 3, Table 3-2.3. Compliance with this NFPA code is required per Appendix G of the UC contract.

## **6.4 Impairments**

If one or more of the operational requirements listed in Section 6.1.1 are not maintained, follow the actions outlined in Criterion 733, Fire Protection System Impairment Control Program.

### **6.4.1 Inspection (After an Impairment or Modification)**

Visually inspect the entire system in accordance with Appendix A prior to returning it service.

### **6.4.3 Testing (After an Impairment or Modification)**

- Where repair or modification of the system breached the system pressure boundary, hydrostatically test the affected piping prior to returning the system to service.
- Verify that system valves are in their appropriate positions prior to returning the system to service.

## **6.5 Personnel**

Operational testing and alarm verification will be conducted by SSS personnel, in compliance with LIR 402-910-01, Section 6.0.

*Basis:* LIR 402-910-01.4, LANL Fire Protection Program

## **7.0 RECOMMENDATIONS AND GOOD PRACTICES**

The information provided in this section is recommended based on acceptable industry practices and should be implemented by each user based on his/her unique application and operating history of the subject systems/equipment.

### **7.1 Operations Recommendations**

None.

### **7.2 Maintenance Recommendations**

#### **7.2.1** Persons other than SSS Fire Protection Maintenance personnel may conduct visual inspection requirements identified in this document.

*Basis:* LIR 402-910-01.4, LANL Fire Protection Program

## 8.0 GUIDANCE

### 8.1 Operations Guidance

- 8.1.1** For additional guidance on conduct of operations at nuclear facilities, refer to DOE O 5480.19, Chapter VIII, Part 9, “Temporary Modification Control”.

### 8.2 Maintenance Guidance

- 8.2.1** For additional guidance on conduct of operations at nuclear facilities, refer to DOE O 5480.19, Chapter VIII, Part 7 for “Equipment Post-Maintenance Testing and Return to Service”.

## 9.0 REQUIRED DOCUMENTATION

Maintenance history shall be maintained for dry standpipe systems to include, as a minimum, the parameters listed in the Table 9-1 below:

**Table 9-1 Documentation Parameters**

<b>MAINTENANCE HISTORY DOCUMENTATION PARAMETERS</b>				
<b>PARAMETER</b>	<b>ML 1</b>	<b>ML 2</b>	<b>ML 3</b>	<b>ML 4</b>
<b>Dry Standpipe Maintenance Activities</b>				
Repair / Adjustments	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
PM Activities	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Dry Standpipe Equipment Problems</b>				
Failure Dates	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Failure Root Cause	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Dry Standpipe Inspection Results (per this Criterion)</b>				
Inspection Date	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
SSC Condition	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

*Basis:* Documentation of the parameters listed in Table 9-1 above satisfies the requirements of LPR 230-07-00, Criteria 2, (Ref. 10.5) which states; “Maintenance activities, equipment problems, and inspection and test results are documented.”

## **10.0 REFERENCES**

The following references, and associated revisions, were used in the development of this document.

- 10.1** LIR 230-05-01.0, Operations and Maintenance Manual.
- 10.2** DOE O 430.1A, Attachment 2 “Contractor Requirements Document” (Paragraph 2, Sections A through C), a requirement of Appendix G of the UC Contract.
- 10.3** DOE Order 4330.4B, Maintenance Management Program, Section 3.4.9.
- 10.4** DOE Approved Equivalency for NFPA 25, 1998 Standard for Water-Based Fire Protection Systems.
- 10.5** LIR 301-00-02.0, Variances and Exceptions to Laboratory Operation Requirements.
- 10.6** LPR 230-07-00, Maintenance History, Performance Criteria [2].
- 10.7** LIR 402-910-01.4, LANL Fire Protection Program
- 10.8** NFPA 14, 2000 Edition for Standpipe, Private Hydrant, and Hose Systems
- 10.9** NFPA 25, 1998 Standard for Water-Based Fire Protection Systems

## **11.0 APPENDICES**

**Appendix A:** Quarterly Inspection and Maintenance of Dry Standpipe Systems

## APPENDIX A

### Quarterly Inspection and Maintenance of Dry Standpipe Systems

CHECK POINTS	CORRECTIVE ACTION
<b>HOSE VALVE OUTLETS</b>	
1. Cap missing	1. Replace
2. Hose connection damaged	2. Repair
3. Valve handles missing	3. Replace
4. Gaskets missing/deteriorated	4. Replace
5. Visible obstructions	5. Remove
<b>PIPING</b>	
1. Piping damaged	1. Repair
2. Control valves damaged	2. Repair/Replace
3. Support device missing or damaged	3. Repair/Replace
4. Supervisory devices damaged	4. Repair/Replace
<b>CABINET</b>	
1. Check overall condition	1. Repair or replace parts as necessary
2. Difficult to open	2. Repair
3. Door will not fully open	3. Repair or remove obstructions
4. Door glazing cracked/broken	4. Replace
5. Not identified as containing fire equipment	5. Provide identification
6. Visible obstructions	6. Remove
7. All valves, extinguishers easily accessible	7. Remove non-fire related materials